

IN THE CLAIMS:

Please CANCEL claims 1-36 without prejudice to or disclaimer of the recited subject matter.

Please ADD new Claims 37-60, as follows. For the Examiner's convenience, all claims currently pending in this application have been reproduced below:

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1-36. (Cancelled)

37. (New) A position detection apparatus for detecting a position of a mark on an object, said apparatus comprising:  
a camera which captures an image of the mark;  
an extraction section which extracts a plurality of edge positions of the mark based on a signal derived from the image of the mark, each of the edge positions being associated with a combination of a direction and a polarity of the signal;  
a determination section which determines a position of the mark, by comparing each of the plurality of extracted edge positions with a corresponding one of templates prepared for the respective combinations.

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38. (New) An apparatus according to claim 37, further comprising a control section which changes a parameter used by said extraction section and said determination section based on a result of the comparing by said determination section.

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39. (New) An apparatus according to claim 38, wherein the parameter changed by said control section is stored in a memory and used as a base for processing to be executed later.

40. (New) An apparatus according to claim 37, wherein said determination section performs the comparing by evaluating a degree of matching between the plurality of edge positions and the templates.

41. (New) An apparatus according to claim 40, wherein said determination section determines the position of the mark as a center position of the template based on the degree of matching.

42. (New) An apparatus according to claim 37, wherein said determination section performs the comparing using a correlation method.

43. (New) An apparatus according to claim 37, wherein said extraction section obtains the signal by differentiating a signal of the image.

44. (New) An apparatus according to claim 43, wherein the polarity is a sign of the differential signal.

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45. (New) An apparatus according to claim 37, wherein said extraction section obtains the signal along each of at least two directions in the image.

46. (New) An apparatus according to claim 37, wherein the template for each of the combinations includes a plurality of positions of interest.

47. (New) An apparatus according to claim 37, wherein a parameter used for at least one of a noise removal processing for the image and a correction of the edge position is changed based on the result of the comparing by said determination section.

48. (New) An apparatus according to claim 37, wherein said camera captures the image under a dark field illumination.

49. (New) A position detection method of detecting a position of a mark on an object, said method comprising the steps of:

capturing an image of the mark using a camera;

extracting a plurality of edge positions of the mark from a signal derived from the image of the mark, each of the edge positions being associated with a combination of a direction and a polarity of the signal; and

determining a position of the mark by comparing each of the plurality of edge positions with a corresponding one of templates prepared for the respective combinations.

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(V) 50. (New) A method according to claim 49, further comprising a control step which changes a parameter used in said extraction step and said determination step based on a result of the comparing in said determination step.

51. (New) An method according to claim 50, wherein the parameter changed in said control step is stored in a memory and used as a base for processing to be executed later.

52. (New) An method according to claim 49, wherein said determined step performs the comparing by evaluating a degree of matching between the plurality of edge positions and the templates.

53. (New) A method according to claim 52, wherein said determination step determines the position of the mark as a center position of the template based on the degree of matching.

54. (New) A method according to claim 49, wherein said determination step performs the comparing using a correlation method.

55. (New) An method according to claim 49, wherein said extraction step obtains the signal by differentiating a signal of the image.

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56. (New) A method according to claim 55, wherein the polarity is a sign of the differential signal.

57. (New) A method according to claim 49, wherein said extraction step obtains the signal along each of at least two directions in the image.

58. (New) A method according to claim 49, wherein the template for each of the combinations includes a plurality of positions of interest.

59. (New) A method according to claim 49, wherein a parameter used for at least one of a noise removal processing for the image and a correction of the edge position is changed based on the result of the comparing in said determination step.

60. (New) A method according to claim 49, wherein said camera captures the image under a dark field illumination.